converting means for converting an output of the temperature reading circuit into a specified brightness value of the liquid crystal panel,

wherein brightness and chromaticity of the liquid crystal panel are corrected by controlling light emission of the backlight according to the measurement values obtained from the optical sensors in such a way that the surface temperature of the backlight is kept constant.

12. (Amended) An image processing device including a display panel and a light source that emits light that is received and used by the display panel to produce an image, comprising:

a sensor for measuring how light is emitted from the display panel,

wherein brightness or chromaticity or both of image(s) output from the display panel is corrected by controlling light emission of the light source according to a measurement value obtained from the sensor.

REMARKS

This is in response to the Office Action dated August 22, 2002. Claims 1-12 are pending. Attached hereto is a marked-up version of the changes made to the claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made.**"

For purposes of example only, and without limitation, certain example embodiments of this invention relate to an LCD including a backlight, wherein light

emission from the backlight is automatically controlled in order to achieve a desired brightness emission from the LCD panel. As shown in Fig. 1A of the instant application for example, a sensor 2 detects brightness of an image emitted from the LCD panel 1. Calculator 5 compares the brightness from the LCD panel 1 with a predetermined brightness value that is desired from brightness setter 9, and determines a difference therebetween. Based on the difference between the current brightness of the LCD panel 1 as measured by the sensor(s) 2 and the desired brightness from setter 9, the light source 11 of the backlight assembly 3 is controlled in order to automatically adjust the brightness being emitted from the LCD panel to bring it into conformity with the desired brightness value. In such a manner, the brightness of image data emitted from the panel 1 can be automatically adjusted *without* having to use the LCD driver circuitry for this purpose. In particular, it is the light source (*not* the LCD driver circuitry) which is adjusted in order to automatically adjust the LCD output with respect to desired brightness.

1. Section 112 Rejections

Claims 1-12 stand rejected under 35 U.S.C. Section 112, first paragraph, as being allegedly non-enabled. The Office Action cites U.S. Patent No. 6,388,648 and contends that change of brightness will lead to unpredictable and possibly unacceptable color shift. This Section 112 rejection is respectfully traversed for at least the following reasons.

The instant specification, including the drawings, clearly teach one of skill in the art how to make and use the instant claimed inventions. Detailed circuitry is illustrated

for purposes of example in Figs. 1, 7, and 8. One of skill in the art could have easily made examples of the instant invention based on the disclosure as filed.

The cited '648 Patent teaches directly away from certain embodiments of the instant invention. The '648 Patent teaches that it is *undesirable* to adjust the output of an arc lamp used to illuminate an LCD panel (col. 7, lines 30-35). In contrast with embodiments of the instant invention, the '648 Patent teaches that lamp adjustments should *not* be made, and that the LCD driving signals (which are supplied to the various pixels in the display panel – not to the light source) should be used to adjust display output (col. 7, lines 30-40). Just because the '648 Patent teaches away from embodiments of the instant invention does not mean that the instant invention is not enabled. If this were the law (which it is not), then most patentable subject matter would be subject to rejection under Section 112, first paragraph; this clearly is not the purposes or function of the statute. The instant specification illustrates in detail (much more detail than necessary) how to make and use the instant inventions. This Section 112 rejection is incorrect, and lacks merit.

Claim 11 stands rejected under 35 U.S.C. Section 112, first paragraph, in paragraph 3 of the Office Action. The Office Action contends that optical sensors are not described in the specification. This rejection is respectfully traversed. Optical sensors for sensing display brightness for purposes of measurement analysis are known in the art. Optical sensors are clearly enabled. Moreover, the claims are part of the specification as filed, and this subject matter described in both the claims and in the description portion of the specification. This Section 112 rejection should be withdrawn.

2. Prior Art Rejections

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Tsuzuki in view of Clifton. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires "a light source for emitting light toward the liquid crystal panel that the liquid crystal panel receives and uses for display operation thereof; and an optical sensor for measuring how the liquid crystal panel is emitting R, G, and B light, wherein light emission of the light source is controlled according to a measurement value obtained from the optical sensor in order to correct brightness or chromaticity or both of the liquid crystal panel." In other words, claim 1 clearly require that the output of the light source of the backlight is adjusted in order to control display brightness. Both Tsuzuki and Clifton fail to disclose or suggest this - and Clifton teaches to avoid this.

Tsuzuki discloses a technique for automatically adjusting brightness of an LCD based on image data received by a sensor at the front of the display panel (e.g., see Figs. 13-14, and col. 18, lines 1-43). However, Tsuzuki significantly differs from the invention of claim 1 in that Tsuzuki does *not* adjust *backlight emissions* as part of the brightness adjustment. Instead, in order to adjust brightness of the LCD panel, Tsuzuki adjusts the driver circuit signals applied to the display panel (i.e., brightness is adjusted by using different grey-scale levels in the display panel itself – *not* but adjusting the backlight). See Tsuzuki at Fig. 13 where the display driver circuit 95 is the means by which the display is adjusted. Accordingly, Tsuzuki fails to disclose or suggest backlight adjustment in the context of brightness adjustment/control of a display panel.

Clifton is similarly flawed. Moreover, Clifton expressly criticizes light source adjustments. Clifton states that the light source is not to be adjusted, and that instead the display control is to be performed by changing the driver circuitry 104 signals (e.g., see Figs. 8-10; col. 7, lines 30-40; col. 10, lines 26-32; and col. 15, lines 29-33). Clifton is similar to Tsuzuki in that both use the driver circuit(s) (not adjustment of light source emissions) to adjust display brightness.

It can be seen that both Tsuzuki and Clifton fail to disclose or suggest that the output of the light source of the backlight is adjusted in order to control display brightness (Clifton actually teaches that this claimed feature is undesirable and should be avoided). Thus, even if the two references were combined as alleged in the Office Action (which applicant believes would be incorrect in any event), the invention of claim 1 still would not be met. Moreover, in view of Clifton's teaching that light source adjustment is to be avoided, one of ordinary skill in the art would never have modified Tsuzuki in order to provide light source adjustment since the art teaches that this should not be done.

Claim 10 requires that "the brightness of the liquid crystal panel is corrected by controlling light emission of the backlight according to the measurement value obtained from the optical sensor." Again, the cited art fails to disclose or suggest this aspect of claim 10.

Claim 12 requires that "brightness or chromaticity or both of image(s) output from the display panel is corrected by controlling light emission of the light source according to a measurement value obtained from the sensor." Again, the cited art fails to disclose or suggest this aspect of claim 12, whether taken alone or in combination.

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) An image display device, comprising:

a liquid crystal panel for displaying an [RGB] image including RGB colors;

a light source for [supplying] emitting light toward the liquid crystal panel that the liquid crystal panel receives and uses [needs] for display operation thereof; and

an optical sensor for measuring how the liquid crystal panel is emitting R, G, and B light,

wherein [lighting of] light emission of the light source is controlled according to a measurement value obtained from the optical sensor in order to correct brightness or chromaticity or both of the liquid crystal panel.

5. (Amended) An image display device as claimed in claim 1, wherein the brightness and/or chromaticity of the liquid crystal panel is corrected by controlling a driving voltage or driving current of the light source.

6. (Amended) An image display device as claimed in claim 1, wherein the light source is part of a backlight provided [on] at the back of the liquid crystal panel.

10. (Amended) An image display device comprising:

a liquid crystal panel for displaying an [RGB] image;

a backlight for illuminating the liquid crystal panel from behind;

an optical sensor for measuring brightness of at least part of an image emitted from the liquid crystal panel[how the liquid crystal panel is emitting R, G, and B light];

a signal reading circuit for converting a measurement value obtained from the optical sensor into a current brightness value of the liquid crystal panel;

a brightness setting [means] circuit for permitting entry of specified brightness of the liquid crystal panel;

a converting [means] circuit for converting an output of the brightness setting [means] circuit into a specified brightness value of the liquid crystal panel;

a calculator for calculating a difference between the current brightness value and the specified brightness value of the liquid crystal panel;

a duty factor setting circuit for outputting a pulse signal whose duty factor depends on an output of the calculator; and

an inverter for producing a driving voltage and a driving current for the backlight according to the pulse signal,

wherein the brightness of the liquid crystal panel is corrected by controlling light[ing] emission of the backlight according to the measurement value obtained from the optical sensor.

11. (Amended) An image display device as claimed in claim 10, further comprising:

a plurality of said optical sensors for measuring how the liquid crystal panel is emitting R, G, and B light independently for the R, G, and B light;

a signal reading circuit for converting measurement values obtained from the optical sensors into a current brightness value and a current chromaticity value of the liquid crystal panel;

a thermistor whose resistance varies with surface temperature of the backlight;

a temperature reading circuit for converting the resistance of the thermistor into a surface temperature value of the backlight; and

converting means for converting an output of the temperature reading circuit into a specified brightness value of the liquid crystal panel,

wherein brightness and chromaticity of the liquid crystal panel are corrected by controlling [lighting] light emission of the backlight according to the measurement values obtained from the optical sensors in such a way that the surface temperature of the backlight is kept constant.

12. (Amended) An image processing device including a display panel and a light source that emits light that is received and used by the display panel to produce an image, comprising:

[varying means for varying how R, G, and B light is emitted to display an image on a display panel; and]

a sensor for measuring how [the R, G, and B] light is emitted [to display the image] from the display panel,

wherein brightness or chromaticity or both of [the] image(s) output from the display panel is corrected by controlling light emission of the light source [the varying means] according to a measurement value obtained from the sensor.